Bicycle Helmets and the Experimenter Effect

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Introduction

We read with great interest the paper entitled "Wearing a Bicycle Helmet Can Increase Risk Taking and Sensation Seeking in Adults" published in *Psychological Science* (Gamble and Walker, 2016). Gamble and Walker tested whether "risk taking increases in people who are not explicitly aware they are wearing protective equipment." They compared two groups of participants, one wearing a bicycle helmet and the other group wearing a baseball cap. Both completed a laboratory measure of risk taking (Balloon Analogue Risk Task-BART; Lejuez et al., 2002), and a measure of sensation seeking (Sensation Seeking Scale; Zuckerman, Eysenck, & Eysenck, 1978). The helmet-group scored higher on both measures. The authors proposed "that unconscious activation of safety-related concepts primes globally increased risk propensity." The paper received a great deal of media attention despite several serious methodological shortcomings.

Experimenter effect

The authors reported that the participants were blinded to the purpose of the experiment as they were told they "would complete a number of computer-based risk-taking measures while their point of gaze was measured using a head-mounted eye tracker." The experimenters, on the other hand, were not blinded. They were aware of the fake setup and of the real purpose of the experiment and interacted a great deal with the participants ("…the experimenter placed the cap- or helmet-mounted eye tracker on the participant's head, making a show of carefully aligning everything as in a real eye-tracking procedure. The experimenter then moved to the eye-tracking computer, where he or she ran the fake calibration software and conspicuously adjusted the eye-tracking controls to make it appear to participants that their eye movements were really being tracked"). It is possible that the experimenters unconsciously conveyed their expectations to participants and thereby affected their responses, as per the experimenter expectancy effect (Gilder & Heerey, in press; Miller & Turnbull, 1986; Rosenthal, 1966). To eliminate experimenter expectancy effects, when possible a double-blind design should be used in which both experimenters and participants are blinded to the purpose of the experiment and/or to whether a participant belongs to the experimental or control group.

The rule rather than the exception in traffic safety research

Another study from the same laboratory (Walker, 2007) also received great attention from the media but it has the same methodological flaws. It reported that motor vehicle drivers who overtake cyclists give less space to those wearing a helmet. The author rode a bicycle with and without a helmet and measured how closely drivers overtook him. Although drivers were effectively blinded, the experimenter was not. Consequently, his hypothesis could influence overtaking distances by, for example, head movements suggesting an intended turn prompting drivers to give him a wider berth. Thus the effect could be an artifact of the experimenter (consciously or unconsciously) more often making such head movements when not wearing a helmet than when riding with a helmet. This account is, of course, purely speculative, but the point is that the lack of a double-blind procedure leaves open the possibility of such experimenter effects

Both these studies illustrate that, unfortunately, the double-blind procedure “is not often used in the field of traffic research, especially when it comes to keeping the experimenter in the dark about the purpose of the study” (Ahlstrom, 2013, p.555). Furthermore, quite often information about the presence or absence of the experimenter during the testing is missing from published studies, even in major psychology journals. For example, such information was missing in about 80% of the experimental studies published in *Psychological Science* (Vol 16, 2005) and in about 60% of articles in the *Journal of Personality and Social Psychology* (Vol. 101, 2011; Klein et al., 2012).

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Effect sizes

It has been shown that “blind protocols are uncommon in the life sciences and nonblind studies tend to report higher effect sizes and more significant p-values” Holman et al. (2015, p.1). The mean effect size of expectancy effects in different types of experiments with human participants can reach Cohen's d of 1 (Rosenthal, 1994), which exceeds the observed effect sizes in Gamble and Walker study (2016); however, we are unaware of a study with similar setting, which would allow direct comparison. The observed effect size on the Sensation Seeking Scale, which measures a personality trait, was apparently larger than for BART, which is a simple computerized test (Cohen's d of 0.73 vs. 0.59); however, no explanation was offered for this finding.

On the other hand, the authors “hoped to see relatively substantial effects of the helmet manipulation” and the study was powered to detect an effect-size of Cohen's d=0.63. It is unclear why such a large effect size was expected when the approach in the study was completely different from “Hedlund’s first rule of risk compensation: ‘If I don’t know it’s there, I won’t compensate for a safety measure’” (Gamble and Walker, 2016, p.289). As was noted in an editorial in this Journal (Lindsay, 2015), the reason for the choice of a particular effect size is often unclear (“Other times, authors say that they assumed a medium-sized effect (e.g., Cohen’s d of 0.50) but do not cite evidence backing up that estimated effect size”).

Choice of participants and demand characteristics

The authors did not report how or from where they had recruited their participants. They only stated (p. 290) that “no monetary reward was offered for participation.” This might indicate the participants were students. If they were indeed the authors’ students or those of their university who were aware of their well-publicized helmet research, the helmet possibly led to activation of a different nature (Orne, 1962) than the proposed “unconscious activation of safety-related concepts.” A fully informed experimenter might exacerbate this so-called good subject effect (Orne, 1962). Therefore, even if one accepts the possibility that helmet wearing can lead to unconscious activation of safety-related concepts and subsequently increase risk taking, the employed experimental design gives little reason to believe the observed results were solely or largely due to helmet wearing.

Concluding remarks

Whether or to what extent the experimenter effect was present in the Gamble and Walker (2016) study is impossible to assess. Nevertheless, it is clear that a double-blind procedure has been developed with a reason and should have been used in this study. The importance of “blinding” has been recently stressed in a “manifesto for reproducible science” (Munafo et al., 2017). Accordingly, we urge readers, reviewers, and editors to pay more attention to these methodological issues, especially in well publicized, supposed ‘breakthrough’ studies that might have an unwarranted effect on the views of the general public and policy makers.

References

Ahlstrom, C. (2013). Response to the letter to the editor on electronic billboards and driver distraction. *Traffic Injury Prevention, 14*, 554–555. doi: 10.1080/15389588.2012.746680

Gamble, T., & Walker, I. (2007). Wearing a bicycle helmet can increase risk taking and sensation seeking in adults. *Psychological Science, 27*, 289–294. doi: 10.1177/0956797615620784

Gilder, T.S.E., Heerey, E.A. (in press). The role of experimenter belief in social priming. Psychological Science.

Holman, L., Head, M.L., Lanfear, R., & Jennions, M.D. (2015). Evidence of experimental bias in the life sciences: why we need blind data recording. *PLoS Biol 13(7):* e1002190. doi: 10.1371/journal.pbio.1002190

Klein, O., Doyen, S., Leys, C., Miller, S., Questienne, L., & Cleeremans A. (2012). Low hopes, high expectations, expectancy effects, and the replicability of behavioral experiments. *Perspectives on Psychological Science, 7,* 572-584. doi: 10.1177/1745691612463704

Lejuez, C. W., Read, J. P., Kahler, C. W., Richards, J. B., Ramsey, S. E., Stuart, G. L., et al. (2002). Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART). *Journal of Experimental Psychology: Applied, 8,* 75–84. doi:10.1037/1076-898X.8.2.75

Lindsay, S. (2015). Replication in Psychological Science (Editorial). *Psychological Science*, *26,* 1827–1832. doi: 10.1177/0956797615616374

Miller, D., Turnbull, W. (1986). Expectancies and interpersonal processes. *Annual Review of Psychology*, *37*, 233–256.

Munafò, M. R., Nosek, B.A., Bishop, D. V. M., Button, K. S., Chambers, C.D., Percie du Sert, N., et al.(2017). A manifesto for reproducible science. *Nature Human Behaviour 1*, 0021. doi: 10.1038/s41562-016-0021

Orne, M.T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist, 17*, 776–783.

Rosenthal, R. (1994). Interpersonal expectancy effects: A 30-year perspective. *Current Directions in Psychological Science, 3*, 176–179.

Rosenthal, R. (1966). *Experimenter Effects in Behavioral Research*. New York, NY: Appleton-Century-Crofts.

Walker, I. (2007). Drivers overtaking bicyclists: Objective data on the effects of riding position, helmet use, vehicle type and apparent gender. *Accident Analysis & Prevention, 39*, 417–425. doi: 10.1016/j.aap.2006.08.010

Zuckerman, M., Eysenck, S. B. J., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural, age, and sex comparisons. *Journal of Consulting and Clinical Psychology, 46*, 139–149. doi:10.1037/0022-006X.46.1.139